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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/774,724

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EXAMINER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/774,724	Applicant(s) MOMTAZ ET AL.	
	Examiner Kenneth J. Malkowski	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-11 and 13-20 is/are rejected.
- 7) ☒ Claim(s) 6, 12 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2, 8 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 2, 8 and 17 state that the "continuous time filter is configured to 'pre-distort' the incoming data signal." However, pre-distortion is commonly known in the art as a distortion signal that is applied to a transmitted signal prior to transmission such that the signal compensates inversely with regard to future incurred distortions such as distortion gained by transmission through an optical fiber. It is unclear how an incoming data signal can be "pre-distorted."

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-2, 7-8, 11-12, 14-15 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication No. 2004/0151268 to Hidaka et al.

With respect to claims 1, 7 and 14-15, Hidaka discloses an optical communication device comprising (complete with transmitter 12, communication media 16, and receiver 14, Figure 1): a continuous time filter (page 3 paragraph 24 (continuous time analog filter))(32, Figure 2)(42, Figure 3) having an adjustable bandwidth, wherein the continuous time filter is configured to reduce channel induced pre-cursor interference in an incoming data signal (page 4 paragraphs 47-48 (adaptation matrix 82 provides parameters for compensating both pre-cursor and post – cursor ISI))(page 2 paragraph 24 (adjustable filter 32 compensates for distortion in the signal wherein control and adjustment of adjustable filter is provided by adaptation control 39)), and generate a filtered incoming data signal (page 2 paragraph 28 (adjustable filter receives transmitted data sequence a_k after the signal has traveled over channel 42)); and a decision feedback equalizer, coupled to the continuous time filter, and configured to reduce post-cursor interference (page 4 paragraphs 47-48 (adaptation matrix 82 provides parameters for compensating both pre-cursor and post – cursor ISI)) in the filtered incoming data signal (page 2 paragraph 22 (adaptive equalization system provides high-degree equalization to overcome ISI in the data signal communicated)) and output a compensated signal and equalized data (Signal a^k in Figure 3)(page 2 paragraph 24 (filter compensates for distortion))(page 3 paragraph

34 (data sequence passes through equalizer)) and a bandwidth controller (page 2 paragraph 24 (control and adjustment of adjustable filter 32 is provided by adaptation control 39))(Hidaka: 39, Figure 2) configured to receive the compensated signal from the decision feedback equalizer (feedback from detector 134 is sent to bandwidth control unit 137) and estimate a bandwidth error of the continuous time filter based thereon (136, Figure 4 (error calculator)), the bandwidth controller further configured to generate a control signal based on the bandwidth error (signal from unit 137 is a control signal used to adjust the continuous time filter 132, Figure 4) and to adjust the bandwidth of the continuous time filter (132, Figure 4) using the control signal, and thereby reduce the bandwidth error as determined from the decision feedback equalizer (page 2 paragraph 25 (decision feedback detector provides decision feedback equalization data to bandwidth calculator 38 which is further sent to adjustable filter 32 as a control signal to provide distortion compensation)).

With respect to claims 2 and 17 Hidaka discloses the communication device of claim 1 wherein the continuous time filter (page 3 paragraph 24 (continuous time analog filter))(32, Figure 2)(42, Figure 3) is configured to compensate the incoming data signal, based on the control signal, to thereby improve an operation of the decision feedback equalizer (Hidaka: page 2 paragraph 24 (control and adjustment of adjustable filter 32 is provided by adaptation control 39))(Hidaka: 39, Figure 2)(Hidaka: 38, Figure 2 (error calculator)) (Hidaka: page 2 paragraph 28 (adjustable filter receives a control signal for adjustment of filter coefficients))(Hidaka: page 3 paragraph 32 (calculation of error e_i is

used to adjust subsequent signals passing through adjustable filter 44 to compensate for distortion)).

With respect to claim 8, Hidaka discloses the receiver of claim 7, wherein the bandwidth controller (page 2 paragraph 24 (control and adjustment of adjustable filter 32 is provided by adaptation control 39))(Hidaka: 39, Figure 2) is configured to estimate a bandwidth error (page 3 paragraph 33 (error is calculated to adjust compensation of the filter)) of the continuous time filter (44, Figure 4) based on the compensated signal (signal exiting detector 48, Figure 4), and to adjust the adjustable bandwidth of the continuous time filter to reduce the bandwidth error (page 3 paragraph 33 (calculation of the error is used to adjust the adjustable filter to compensate for distortion)).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3, 9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/0151268 to Hidaka et al. in view of U.S. Patent No. 5,179,302 to Wagner et al.

With respect to claims 3, 9 and 16 Hidaka discloses the communication device of claim 1, however fails to specifically disclose the continuous time filter comprises at least one cascaded low pass filter. However, adjustable filters comprising at least one

cascaded low pass filter is are known in the art and cannot be considered a patentable limitation. Wagner, from the same field of endeavor discloses a tunable filter (title, tunable data filter) wherein the filter includes cascaded filters wherein the cascaded filter comprises at least one low pass filter (page 2 lines 64-67 (notch filter and low-pass filter are cascaded serially)). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the cascaded low-pass filter as taught by Wagner into the adjustable filter arrangement as taught by Hidaka. The motivation for doing so would have been to reduce bit error rate and noise bandwidth (column 5 lines 53-58). Furthermore, it is known that cascading arrangements approximate which make up higher order transfer functions possess a greater degree of signal quality than a single filter with the same higher order transfer function characteristics.

7. Claims 4,10 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/0151268 to Hidaka et al. in view of U.S. Patent No. 5,179,302 to Wagner et al. and further in view of U.S. Patent No. 6,968,167 to Wu et al.

With respect to claims 4,10 and 18 Hidaka in view of Wagner disclose the communication device of claim 3 wherein each of the at least one low pass filter (Wagner: 90, Figure 3) comprises adjustable capacitive loads coupled to outputs of the differential pair of transistors for adjusting the bandwidth of the low pass filter (Wagner: capacitor 42C is used to tune low pass filter 90)(Wagner: columns 3 lines 1-13 (voltage tunable capacitors coupled to the low-pass filter)). However, Hidaka in view of Wagner fail to specifically disclose a differential of transistors for used for adjusting bandwidth.

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Despite this differential transistor pairs used for bandwidth alteration is well known in the art. Wu, from the same field of endeavor discloses a differential transistor pair arrangement (Figure 4 (a)) substantially similar to the one as disclosed by applicant in applicants specification, Figure 6. Wu teaches calibration of the capacitors (column 43 lines 4-14) and the filter arrangement with a control word (column 18 lines 1-3 and 17-30)(Figure 12a)(column 43 lines 37-46). Wu further teaches an RC low-pass filter (column 44 line 27) can be controlled using a parallel capacitor array ((column 44 lines 52-56). Therefore, it would have been obvious to one of ordinary skill in the art to implement the differential pair of transistors with capacitance control as disclosed by Wu. The motivation for doing so would have been to achieve greater adaptivity (column 18 lines 1-2) and also to provide frequency planning, agility, and noise immunity (column 13 lines 35-40).

8. Claims 5, 11 and 19 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/0151268 to Hidaka et al. in view of U.S. Patent No. 6,144,697 to Gelfand et al.

With respect to claims 5, 11 and 19 Hidaka discloses the communication device of claim 2, wherein the decision feedback equalizer comprises a summer (55, Figure 3)(70, Figure 5)(116, Figure 7). However, Hidaka fails to disclose the summer is configured to generate the compensated signal. However, such an arrangement is well known in the art. Gelfand, from the same field of endeavor discloses an equalization technique to reduce ISI (title) wherein the output of the summer (64, Figure 2) configured to generate the compensated signal (65, Figure 2) by combining an

equalized feedback signal (89, figure 2) with the filtered incoming data signal (79, Figure 2). Therefore, it would have been obvious to one of ordinary skill in the art to implement the specific feedback implementation as disclosed by Gelfand into the system as disclosed by Hidaka. The motivation for doing so would have been to facilitate the removal of inter-symbol interference from sparse signal portions *before* sparseness is potentially diminished by other equalization procedures (Gelfand: column 2 lines 25-30). Furthermore, the setup as taught by Gelfand advantageously reduces multiplication operations and more efficiently uses limited multiplier resources (Gelfand: column 2 lines 30-34).

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/0151268 to Hidaka et al. in view of U.S. Patent Application Publication No. 2005/0019042 to Kaneda et al.

With respect to claim 13, Hidaka discloses the communication system of claim 7, however does not describe specifics of optical communication. Kaneda, from the same field of endeavor discloses a receiver (Figure 4) further comprising an optical detector for converting the received information signal to an electrical signal (page 1 paragraph 4 (optical receiver includes a photo-detector for converting a received optical signal to an electrical signal)). Therefore, it would have been obvious to one of ordinary skill in the art to implement the optical communication elements as disclosed by Kaneda into the transmission system as disclosed by Hidaka. The motivation for doing so would have been to keep pace with increasing bandwidth demands (Kaneda: page 1 paragraph 2).

Allowable Subject Matter

10. Claims 6, 12 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

11. Applicant's arguments with respect to claims 1-5, 7-11 and 13-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to further show the state of the art with respect to increasing signal quality in photonic networks in general:

U.S. Patent Application Publication No. 2005/0123036 is cited to show bandwidth control using dfe and filter bandwidth alteration

U.S. Patent Application Publication No. 2004/0044713 is cited to show adaptive filter coefficient determination

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J. Malkowski whose telephone number is (571) 272-5505. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KJM 5/17/07


KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER